RW 14.8

a) $H(s) = \frac{5s+1}{s+10}$ find Bode plot

$$H(j\omega) = H(s)\Big|_{s \to j\omega}$$

$$= \frac{5j\omega + 1}{j\omega + 10} \quad \frac{10 - j\omega}{10 - j\omega} = \frac{50j\omega + 5\omega^2 + 10 - j\omega}{100 + \omega^2}$$

$$= \frac{10 + 5\omega^2 + 49j\omega}{100 + \omega^2}$$

$$|H(j\omega)| = \frac{\sqrt{(10 + 5\omega^2)^2 + (49\omega)^2}}{100 + \omega^2}$$

$$= 20 \log_{10}\left(\frac{\sqrt{(10 + 5\omega^2)^2 + (49\omega)^2}}{100 + \omega^2}\right) \quad dB$$

$$\angle H(j\omega) = \tan^{-1}\left(\frac{49\omega}{10 + 5\omega^2}\right)$$

ω	10^{-2}	10^{-1}	10^{0}	10^{1}	10^{2}
dB	-19				
deg					